

# SUPPLEMENT TO THE HISTELEC NEWS

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## TORQUAY IN 1898

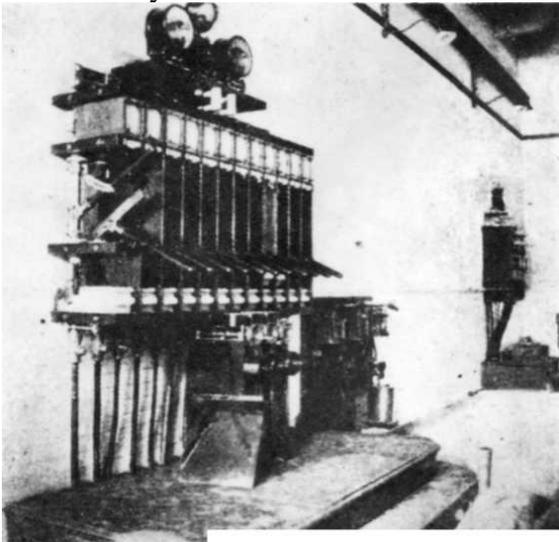
*As a prelude to the publication next year of a booklet by the Society entitled "Torquay's Electricity History" written by John Dike and Peter Lamb, we reprint a copy of an article unearthed in their researches from our archives written in the Electrician dated 31<sup>st</sup> May 1929, on the occasion of the Annual Convention at Torquay of the Incorporated Municipal Electrical Association (IMEA). It is very revealing of the hazards and experiences of an engineer in those early days of generation.*

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### **Reminiscences of thirty years ago – Ingenuity of the Arc Lighting Engineer – The Famous Ferranti Rectifier – Hazardous Task of Switching-on – Cable-laying Adventures – Trimming the Street Arcs in a Gale.**

By FE Warrilow AMIEE (Then Arc Lamp Attendant and Improver, Torquay Corporation Electricity Department)

On the occasion on which the Torquay Corporation is for the first time entertaining the IMEA at its annual convention, it may be fitting to recall the opening of the first electricity works in the town in 1898, if only to remind the old hands who are still in the game of those pioneer days, and also to remind the youngsters in electricity supply of the good time they are now having as a result of those early efforts.



The switchboard at the Torquay station in 1898, with panel removed to show construction.

Reminiscences of thirty years ago are also worth while because they indicate the remarkable progress made during so short a period.

Torquay in 1898! - Less than a hundred supply stations in operation in Great Britain

and the "battle of the systems" in full swing! Ferranti, Mordey, Crompton, Siemens, Hopkinson, Elwell Parker, Lowrie Hall and Fynn all competing at the electrical end, and Willans, Belliss, Musgrave, Yates and Thom Maclaren and Fowler doing wonders with the reciprocating steam engine; not to forget Parsons and de Laval with their turbines and Crossley and Hornsby with gas and oil engines respectively. The steam raisers, Babcock and Wilcox and Galloway and mechanical stoker enthusiast-like Bennis and Vicars were each and all thrusting themselves to the front.

A wonderful galaxy of engineering talent, but what a patchwork to be presented to the bewildered minds of any municipal authority anxious to give its citizens an efficient electricity supply.

### **Baker as Chairman**

At Torquay in 1898 the chairman of the Electricity Committee was a working baker with a great local reputation for an excellent cottage loaf. He and his colleagues, all good men and true, on the advice of their consulting engineer, Mr Trentham, decided that Torquay should have an alternating current, high tension, single phase supply, and that the arc lighting of Tor Bay should be the wonder of the west; and it was so.

I came to the station from Cheltenham, which at that time had a particularly fine example of arc lighting along its famous promenade. My two years' experience in looking after those arc lamps was deemed sufficient to merit my appointment to Torquay at the magnificent salary (all electricity undertakings paid salaries, not wages, in those days) of 27s per week!

The Torquay Electricity Committee encountered great local opposition to a station on the sea front, which was the only suitable spot for a site on account of circulating water. The amenities of the world-renowned Bay must not be disturbed by a smoke stack, but the borough must be modernised by the introduction of electric light.

After much controversy a compromise was reached by converting two large cellars under the medical baths into the electricity works, these cellars being the property of the Corporation. The flues which carried off the gases from the boilers of the baths were connected through to the two Babcock boilers which supplied steam to the generating sets. There was no smoke stack, but plenty of smoke which, with the wind in a certain quarter, blew slap into the front windows of the Imperial Hotel on the cliffs above the baths.

The amenities of the sea front were certainly preserved but sadly at the expense of the station staff, who were cooped up in a narrow compass with a solid roof overhead and daylight from one end of the engine room only; the boiler room had no natural lighting, and was a positive inferno in the summer for the wretched stoker whose duty it was to fire up by hand!

The three 150 kW units which comprised the whole station were identical. Willans vertical central valve engines, direct coupled to Fynn inductor alternators, with outboard exciters generating at 2,200v, 50 periods. The latest Ferranti cellular switch gear controlled the supply to about half a dozen feeders connected to transformers in pavement tanks in various parts of the town. The station was a

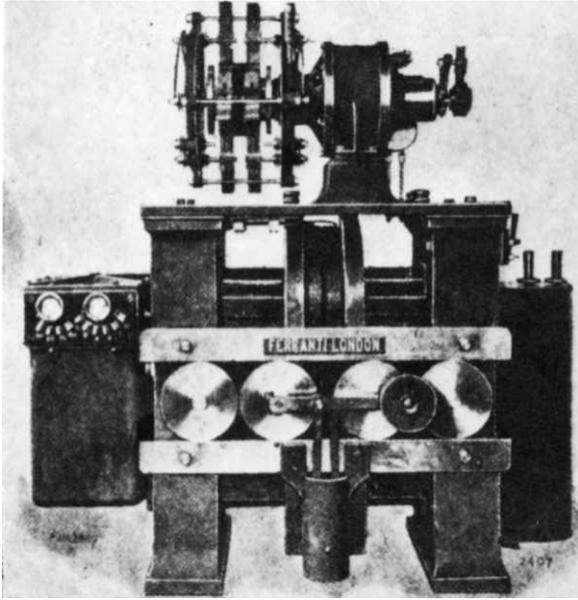
good example of compact equipment, and was a vast improvement on some of the rope and belt motor driven plants which were quite common at that date.

### **The Rectifiers**

But the rectifiers which supplied the arc lighting were the real part of the station. There must still be plenty of engineers today who remember the famous Ferranti rectifier. It was the answer of that wonderful pioneer to the protagonists of the direct current arc lamps which required to be supplied by dynamos driven by engines quite separate from the main generators. S.Z de Ferranti would have no such complication so he devised a rectifying unit which received its current from the HT AC supply and delivered a constant current to the arc lamps, which burned in series on a 2,200v line. We had three such sets at Torquay.

The rectifier comprised a synchronous motor driving a high tension commutator of special construction about 10in. in diameter by some 8in. wide, and fitted with an array of brushes which produced a glorious firework display when the machine was running at about 1,000 rpm. Present-day stations which supply their street lighting by means of high c p gas-filled lamps, turned on from the main works or some sub-stations by remote controlled switches, have no idea of the excitement of series arc lighting from Ferranti rectifiers.

The act of switching on was a dangerous business. A pair of rubber gloves was necessary, and with the right hand a rapier like switch-rod was used for the water resistance to bring up the HT volts as gradually as possible; with the left hand the rocker of the HT rectifying brush gear had to be manipulated to bring the rectified current up on the positive side of the alternating current wave. To make sure of this current being correct, a pole indicator at least 10ft away had to be watched at the moment of making contact with the water resistance switch; if the needle swung over to negative, then whole performance had to be repeated!



One of the Ferranti rectifiers used at Torquay for arc lighting

The first engineer essayed this dangerous operation one evening without rubber gloves, and was badly burned and nearly killed by getting his fingers round the ebonite washer guarding the rod of the water switch. He remained in contact with this at 2,200v, and the charge engineer shut down the one set then running, before releasing his unconscious chief from the rectifier. The engineer (the late Mr. P. Storey) afterwards stated that he attributed his life to this gradual reduction in the voltage, his belief being that the breaking of the HT switch supplying the rectifier would have produced a reaction which would have caused immediate heart failure. After this accident the makers altered the design of the water switch so that accidental contact was impossible.

Such were the risks that we ran with our arc lighting, but it was really wonderful illumination, especially all round Tor Bay. I doubt very much if the present gas-filled lamps can come up to it, though I have not seen Torquay at night-time, since I left it in 1899.

The ingenuity of the arc lighting engineer of those days was well demonstrated in a clever magnetic switch fixed at the base of each arc lamp-post. With this switch two carbon

filament lamps on brackets about 10ft from the ground (on the same post as the arc lamp, of course) were turned on when the arc lamp itself was switched off at midnight. The object of this automatic switch was to supply these carbon-filament lamps from the low tension network, thereby obviating a separate special main for this purpose. The clever part of the switch was a pivoted permanent magnet, arranged in a horizontal position, and having a catch which held the LT switch open when at daybreak a negative or reverse current was supplied to the high tension arc lamp circuit for about 15secs.

The supply of this reverse current to the arc lamps meant the running up of the rectifiers at the station specially for the purpose, but the net result was that the entire street lighting both by arc lamps and carbon-filament lamps could be controlled from the works without the necessity for walking lamp men.

### **Puzzling the Police**

Incidentally the local policemen could never understand why the arc lamps which had been turned off at midnight were again turned on in the early hours of the morning in order that the carbon-filament lamps which supplied the street lighting when burglars and drunks were abroad should be extinguished altogether. To-day such complication would be not only technically unthinkable but without doubt commercially impossible.

We had other excitements in the operation of the station in those days. We started very well on the night of the opening of the works. The Mayor had just proposed success to the enterprise at a dinner in the Queens Hotel when bang went a feeder fuse on the HT board, bang also went a transformer just outside the hotel, and nothing we could do would clear the fault; the dinner was, I believe, finished by candle light!

Service and cable laying was relieved of its usual monotony by the need for blasting the rock which was encountered in certain parts of the borough now and again a little extra "pep" in the charge in a broken shop window.

The use of picks and wedges (there were pneumatic horrors in the streets at that time) always meant two men walking back and forth to some nearby blacksmith for resharping the blunted points; the jarring of the wrists of the most sturdy of the navvies also made progress in trenching very slow.

Torquay was among the earliest of the hilly towns to use lead covered oil impregnated paper cables, and such was the art of manufacture at that time, the oil would descend by gravity along the HT feeders in the steep streets emptying the upper joint boxes and causing leakages in the lower ones; nett result a nice little flash over in the dry box, which in time would "breathe" in a supply of moisture sufficient to cause a short circuit.

The tower ladder with which I trimmed the street arcs was one of the local sights for time, especially when a gale was blowing on the harbour front, but only once was this ladder toppled over when being wheeled across one of the wharves. I narrowly escaped being brained by a pair of heavy pliers which I had carelessly left on the top tray and which came crashing down as soon as I tilted the tower from off its stand and commenced to wheel it!

### **The Multi-job Staff**

The running of a small station then meant that every man had several jobs. The one jointer, after doing his service, would fix the meter and fuse boards on the consumers' premises, and in his spare time would also read the meters; on meter fixing jobs he was not allowed a mate, because the chief thought one such a luxury!

And now it is all changed to the dull monotony of the efficient modern station. The delegates to the IMEA Convention can, however, give a thought or two to the Torquay pioneers who nearly thirty years ago kept the electricity supply going at great personal risk, from a couple of coal cellars at the land end of the northern pier of the outer harbour.

I wonder if the borough electrical engineer could put into the new station at Newton Abbot as a permanent exhibit one of the original rectifiers, and by some means have it running (behind protective triplex glass !), just as we used to run it on load in those dear old days. But probably the machines fetched much more than they cost when new, as scrap metal!



The old generating station at Beacon Quay, now superseded by Newton Abbot Station. This view shows the roof of the engine room buildings on the right. The boiler house was situated in cellars below the Medical Baths on the left.

*Extract from The Electrician May 31<sup>st</sup> 1929  
Pages 343 - 345*